

Listing of Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1.(currently amended) A multi-needle quilting machine comprising:

a frame;

a material drive selectively operable to move a substrate relative to the frame;

at least one stitching-element bridge assembly selectively moveable relative to ~~[[a]]~~
~~the frame and to a substrate when stationary in the frame~~, the bridge having mounted thereon a
plurality of ~~selectively operable~~ stitching elements, each operable to form a series of stitches on the
substrate head assemblies;

a controller operable to control the operation of the material drive, the at least one
bridge and the stitching elements to stitch a selected pattern as the substrate and the at least one
bridge assembly are moving relative to one another, the controller being operable to selectively
enable the formation of stitches when the substrate is moving relative to the frame and to selectively
enable the formation of stitches when the at least one bridge assembly is moving relative to the
frame.

Claims 2-14 (canceled)

15.(currently amended) A method of quilting a substrate with a multi-needle quilting
machine having at least two rows of stitching elements comprising:

with stitching elements of each of the at least two rows activated, stitching a first pattern with
the rows of stitching elements while imparting relative longitudinal movement in a
net forward direction between the stitching elements and the substrate; then
deactivating a first row of the stitching elements at a first set of final longitudinal positions
on the substrate; then,

with the stitching elements of the first row deactivated, further stitching the first pattern with
a second row of the stitching elements while imparting additional relative
longitudinal movement of a first given longitudinal distance in a net forward direction
between the stitching elements and the substrate; then

deactivating the second row of the stitching elements at a second set of final longitudinal positions on the substrate having a predetermined relationship to the first set of final longitudinal positions; then,
maintaining the stitching elements of the first row at a first set of starting longitudinal positions; then
activating the first row of the stitching elements at the first set of starting longitudinal positions on the substrate; then,
with the stitching elements of the first row activated, stitching a second pattern with the first row of the stitching elements while imparting additional relative longitudinal movement a second given distance in a net forward direction between the stitching elements and the substrate; then
activating the second row of the stitching elements at a second set of starting longitudinal positions on the substrate having a predetermined relationship to the first set of starting longitudinal positions; then,
with stitching elements of the first and second rows activated, further stitching the second pattern with the rows of stitching elements while imparting relative longitudinal movement in a net forward direction between the stitching elements and the substrate;
whereby, the first and second final longitudinal positions of the first pattern are less than the first given longitudinal distance apart and the first and second starting longitudinal positions of the second pattern are less than the second given longitudinal distance apart.

16.(original) A method of quilting a substrate with a multi-needle quilting machine having at least two rows of stitching elements comprising:

with stitching elements of the at least two rows activated, stitching a first pattern with the rows of stitching elements while imparting relative longitudinal movement in a net forward direction between the stitching elements and the substrate; then
deactivating a first row of the stitching elements at a first set of final longitudinal positions on the substrate; then,

with the stitching elements of the first row deactivated, further stitching the first pattern with a second row of the stitching elements while imparting additional relative longitudinal movement a first given longitudinal distance in a net forward direction between the stitching elements and the substrate; then
deactivating the second row of the stitching elements at a second set of final longitudinal positions on the substrate having a predetermined relationship to the first set of final longitudinal positions; then,
with the stitching elements of the first and second rows deactivated, imparting relative longitudinal movement in a net backward direction between the stitching elements and the substrate until the stitching elements of the first row are at a first set of starting longitudinal positions less than the given longitudinal distance from the final longitudinal positions of the first set; then
activating the first row of the stitching elements at the first set of starting longitudinal positions on the substrate; then,
with the stitching elements of the first row activated, stitching a second pattern with the first row of the stitching elements while imparting additional relative longitudinal movement a second given distance in a net forward direction between the stitching elements and the substrate; then
activating the second row of the stitching elements at a second set of starting longitudinal positions on the substrate having a predetermined relationship to the first set of starting longitudinal positions; then,
with stitching elements of the first and second rows activated, further stitching the second pattern with the rows of stitching elements while imparting relative longitudinal movement in a net forward direction between the stitching elements and the substrate; whereby, the first and second patterns are stitched on the substrate less than the given distance apart.

17.(currently amended) The method of claim 16 further comprising:
sewing a series of tack stitches with stitching elements of a row when deactivating ~~or~~
~~activating~~ the stitching elements thereof.

18.(original) The method of claim 16 further comprising:
providing a first bridge having the first row of stitching elements thereon and a second bridge
having the second row of stitching elements thereon, each of the bridges being
separately moveable relative to a frame and relative to each other;
the stitching of the first pattern with the rows of stitching elements being carried out with the
bridges stationary and while imparting relative longitudinal movement in a net
forward direction of the substrate relative to the frame;
the further stitching of the first pattern with the second row of the stitching elements is
carried out with the substrate stationary and while imparting the additional relative
longitudinal movement by moving the bridges in a net backward direction relative to
the frame;
the imparting of relative longitudinal movement in a net backward direction is carried out
with the substrate stationary and moving the bridges in a net forward direction
relative to the frame;
the stitching of the second pattern with the first row of the stitching elements is carried out
with the bridges stationary and imparting additional relative longitudinal movement
of the substrate in a net forward direction relative to the frame; and
the further stitching of the second pattern with the rows of stitching elements is carried out
with the bridges stationary and imparting relative longitudinal movement in a net
forward direction of the substrate relative to the frame.

Claims 19-21 (canceled)

22.(new) A method of quilting a substrate with a multi-needle quilting machine having at least two separately actuatable groups of stitching elements, the at least two groups including a first group and a second group that each include a plurality of stitching elements, the method comprising:

with stitching elements of each of the at least two groups activated, quilting a first pattern on a substrate by stitching a first series of stitches of the first pattern with a plurality of the stitching elements of the first group while stitching a second series of stitches of the first pattern with a plurality of the stitching elements of the second group; then deactivating the stitching elements of the first group and further stitching a second series of stitches of the first pattern with a plurality of the stitching elements of the second group; then, deactivating the stitching elements of the second group to complete the quilting of the first pattern on the substrate;

and

after deactivating the stitching elements of the first group, activating stitching elements of the first group and beginning quilting a second pattern on the substrate by stitching a first series of stitches of a second pattern with the plurality of the elements of the first group; then

after the deactivating of the stitching elements of the second group to complete the quilting of the first pattern on the substrate, and after the activating of the stitching elements of the first group and the beginning of the quilting of the second pattern on the substrate, activating stitching elements of the second group and further quilting of the second pattern on a substrate by stitching a second series of stitches of the second pattern with the plurality of the stitching elements of the second group.

23.(new) The method of claim **22** wherein:

the beginning of the quilting of a second pattern on the substrate occurs before the deactivating of the stitching elements of the second group.

24.(new) The method of claim **22** wherein:

the beginning of the quilting of a second pattern on the substrate is carried out after the deactivating of the stitching elements of the second group.

25.(new) The method of claim **24** wherein:

the deactivating of the stitching elements of each of the first and second groups includes sewing tack stitch sequences with stitching elements of the respective groups and then cutting at least a top thread extending therefrom.

26.(new) The method of claim **24** wherein:

the quilting of the first and second patterns includes imparting a net forward longitudinal motion to the substrate relative to each of the first and second groups of stitching elements; and

when the stitching elements of both the first and second groups are deactivated, imparting a net reverse longitudinal motion to the substrate relative to the stitching elements of at least one of the groups.

27.(new) The method of claim **26** further comprising:

maintaining a fixed longitudinal spacing between the stitching elements of the first group and the stitching elements of the second group.

28.(new) The method of claim **27** further comprising:

quilting the first and second patterns at a longitudinal distance apart that is less than the fixed longitudinal spacing between the stitching elements of the different groups;

the net reverse longitudinal motion being less than the fixed longitudinal spacing.

29.(new) The method of claim **28** wherein:

the net reverse longitudinal motion is less than the fixed longitudinal spacing by the amount of the longitudinal distance by which the patterns are to be spaced apart.

30.(new) The method of claim **26** wherein:

the groups of stitching elements are mounted on one or more transverse bridges that are longitudinally moveable relative to the frame of a quilting machine;

the imparting of a net forward longitudinal motion to the substrate relative to each of the first and second groups of stitching elements at least partially includes advancing the substrate in a downstream direction relative to the frame of the quilting machine; and

the imparting of the net reverse longitudinal motion to the substrate relative to the stitching elements of at least one of the groups includes moving a bridge on which the group of stitching elements is mounted in the downstream direction relative to the frame of the quilting machine.

31.(new) The method of claim **30** wherein:

the imparting of a net forward longitudinal motion to the substrate relative to each of the first and second groups of stitching elements during the quilting of the second pattern includes moving the bridge on which the group of stitching elements is mounted in the upstream direction relative to the frame of the quilting machine.

32.(new) The method of claim **26** further comprising:

maintaining the groups of stitching elements on first and second bridges that are separately longitudinally moveable and moveable relative to each other between a minimum longitudinal spacing and a maximum longitudinal spacing.

33.(new) The method of claim **32** further comprising:

quilting the first and second patterns at a longitudinal distance apart that is less than the minimum longitudinal spacing;

the net reverse longitudinal motion being less than the minimum longitudinal spacing.

34.(new) The method of claim **33** wherein:

the net reverse longitudinal motion is less than the minimum longitudinal spacing by the amount of the longitudinal distance by which the patterns are to be spaced apart.

35.(new) The method of claim **24** wherein:

the deactivation of at least some of the stitching elements of the second group takes place in approximate transverse alignment with positions on the substrate at which the deactivation of at least some of the stitching elements of the first group took place; and

the activation of at least some of the stitching elements of the second group takes place in approximate transverse alignment with positions on the substrate at which the activation of at least some of the stitching elements of the first group took place.

36.(new) The quilting machine of claim **1** wherein:

the stitching elements of the plurality include stitching elements selectively operable relative to others of the stitching elements; and

the controller is operable to control the operation of the stitching elements to sew series of stitches with some but not all of the stitching elements.

37.(new) The quilting machine of claim **1** wherein:

the controller is operable to control the operation of the material drive, the at least one bridge and the stitching elements to stitch a selected pattern to enable the formation of stitches when the substrate and the at least one bridge assembly are both moving relative to the frame.

38.(new) The quilting machine of claim **1** wherein:

the at least one stitching-element bridge assembly includes two bridge assemblies moveable relative to the frame, and each having mounted thereon a plurality of the stitching elements.

39.(new) The quilting machine of claim **38** wherein:

the two bridge assemblies are each separately moveable relative to the frame and to each other.

40.(new) The quilting machine of claim **39** wherein:

the material drive is operable to feed the substrate vertically in a vertical plane relative to the frame;

the two bridge assemblies are moveable vertically relative to the frame;

the stitching elements each include a needle oriented horizontally perpendicular to the vertical plane;

the stitching elements of the plurality include stitching elements selectively operable relative to others of the stitching elements;

the controller is operable to control the operation of the stitching elements to sew series of stitches with some but not all of the stitching elements; and

the controller is operable to control the operation of the material drive, two bridge assemblies and the stitching elements to stitch a selected pattern to enable the formation of stitches when either the substrate, one or both bridge assemblies, or the substrate and one or both bridge assemblies, are moving relative to the frame.

41.(new) The quilting machine of claim **1** wherein:

the material drive is operable to feed the substrate vertically in a vertical plane relative to the frame;

the at least one bridge assembly is moveable vertically relative to the frame; and

the stitching elements each include a needle oriented horizontally perpendicular to the vertical plane.